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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 107327AF				FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)			
International application No. PCT/NO 03/00068				International filing date 24.02.2003	(day/month/year)	Priority date (day/month/year) 25.02.2002	
Į.	International Patent Classification (IPC) or both national classification and IPC G01G3/14						
Applicant SINTEF ELEKTRONIKK OG KYBERNETIKK et al.							
1.	 This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. 						
2.	2. This REPORT consists of a total of 5 sheets, including this cover sheet.						
	This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).						
	The	se an	nexes consist of a total of	of 3 sheets.			
				<u> </u>	,.		
3.	This	repo	rt contains indications re	lating to the following it	ems:		
}	1	\boxtimes	Basis of the opinion				
	Ħ		Priority				
	111		Non-establishment of	opinion with regard to r	ovelty, inventive step a	and industrial applicability	
	IV		Lack of unity of inventi	on			
	V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement						
	IV		Certain documents cite	ed			
	VII		Certain defects in the i	nternational applicatior	1		
	. VIII		Certain observations o	n the international app	lication	·	
Date of submission of the demand Date of completion of this report				nis report			
19.09.2003				23.03.2004			
Nam	Name and mailing address of the international				Authorized Officer		
preliminary examining authority: European Patent Office						A STATE OF THE STA	
D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d				56 anmu d	Ştobbelaar, M		
Fax: +49 89 2399 - 4465				oo opina a	Telephone No. +49 89	2399-2827	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/NO 03/00068

ı	B	asis	of	the	rer	ort

 With regard to the elements of the international application (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):

	Des	cription, rages	
	1-10)	as published
	Clai	ms, Numbers	e e e e e e e e e e e e e e e e e e e
	1-18	3	filed with telefax on 02.03.2004
	Dra	wings, Sheets	
	1/4-	4/4	as published
2.	With lang	n regard to the langu juage in which the int	age, all the elements marked above were available or furnished to this Authority in the ernational application was filed, unless otherwise indicated under this item.
	The	se elements were av	ailable of furnished to this Authority in the following language: , which is:
		the language of a tra	anslation furnished for the purposes of the international search (under Rule 23.1(b)).
		the language of publ	ication of the international application (under Rule 48.3(b)).
		the language of a tra Rule 55.2 and/or 55.	anslation furnished for the purposes of international preliminary examination (under 3).
3.	With inte	n regard to any nucle rnational preliminary	eotide and/or amino acid sequence disclosed in the international application, the examination was carried out on the basis of the sequence listing:
		contained in the inte	rnational application in written form.
		filed together with th	e international application in computer readable form.
		furnished subsequer	ntly to this Authority in written form.
		furnished subsequer	ntly to this Authority in computer readable form.
		The statement that the international a	he subsequently furnished written sequence listing does not go beyond the disclosure pplication as filed has been furnished.
		The statement that the listing has been furnitude.	he information recorded in computer readable form is identical to the written sequence ished.
4.	The	amendments have re	esulted in the cancellation of:
		the description,	pages:
		the claims,	Nos.:
		the drawings,	sheets:

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5. 🗆	This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
	(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-18
No: Claims

Inventive step (IS) Yes: Claims 1-18

No: Claims

Industrial applicability (IA) Yes: Claims 1-18

No: Claims

2. Citations and explanations

see separate sheet



Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents: 1.

D1: GB-A-2 296 977 D2: EP-A-1 052 478 D3: US-A-4 553 436

The invention relates to a spring micro scale. Main characteristic of the spring 2. micro scale according to claim 1 is the construction of a load platform suspended with flexural springs extending in succession along the whole periphery of the platform and with attachment spots as defined in claim 1, in combination with a load platform being thin relative to the surrounding frame. Such a construction, permitting to obtain compliance adapted to weighing in the micro-range, and insensitivity as to where a load is placed on the load platform, is not known nor suggested by the prior art documents cited in the search report. Although from the cited documents D1 - D3 disclose similar suspended platforms, they do not related to micro-scales. D1 and D3 relate to accelerometers, in which the platform is not a thin load platform but a thick weight, in order to provide inertial relative motion to be sensed by the strain gauges. D2 relates to a gyroscope, wherein the platform is not a thin load platform but a vibratory plate. A combination of these documents does not result in an obvious way in the spring micro-scale as defined in claim 1.

Therefore the subject-matter of claim 1 meets the requirements of articles 33 (2) and 33 (3) PCT.

Claims 2-18 are dependent on claim 1 and as such also meet the requirements of 3. the PCT with respect to novelty and inventive step.

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EXAMINATION REPORT - SEPARATE SHEET

Additional remarks

- a) Claims 2 and 3 filed with the facsimile dated 02.03.2004 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned in these claims are the functions/effects of the defined characteristics (claim 2: "to obtain insensitivity ... platform"; claim 3: "to provide high compliance ... objects"). It does not follow clearly from the original description, that exactly the defined characteristics in these claims have these functions or effects. Therefore Article 34(2)(b) PCT has been infringed.
- b) Reference signs in parentheses should have been inserted in the claims to increase their intelligibility, Rule 6.2(b) PCT.
- c) To meet the requirements of Rule 5.1(a)(ii) PCT, the documents D1-D3 should have been identified in the description and the relevant background art disclosed therein should be briefly discussed.
- d) The description should have been brought into conformity with the amended claims (Rule 5.1(a)(iii) PCT).

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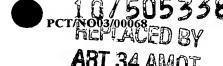
CLAIMS



- 1. Spring scale, comprising a load platform suspended, by at least three flexural springs, in a surrounding frame, and with bridge-connected strain gauges arranged for measuring strain on one side of said flexural springs, characterized in that the flexural springs extend in succession along substantially the whole periphery of the load platform in a gap between the load platform and an inner edge of the frame, and in that an attachment spot on the load platform for each respective flexural spring is arranged substantially directly opposite or past an attachment spot on the inner edge of the frame for a next flexural spring in the succession.
- 2. The spring scale of claim 1, characterized in that the load platform, the flexural springs and the frame are shaped as one single micro-machined or etched piece of solid matter.
- The spring scale of claim 2,
 characterized in that said piece of solid matter is a silicon piece.
- 20 4. The spring scale of claim 2, characterized in that said strain gauges are integral in the piece of solid matter.
 - The spring scale of claim 1,
 characterized in that the strain gauges are piezo-resistive resistors.
 - 6. The spring scale of claim 1, c h a r a c t e r i z e d i n t h a t each flexural spring has a strain gauge placed on a crossing between the flexural spring and the frame or the load platform.
 - 7. The spring scale of claim 1, characterized in that the load platform is substantially quadratic.
 - 8. The spring scale of claim 1,

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characterized in that the flexural springs lie parallel to respective side edges of the load platform.

- 9. The spring scale of claim 7 or 8,
- characterized in that the flexural springs have lengths substantially equal to the lengths of the closest side edges of the load platform.
 - 10. The spring scale of claim 1,

c h a r a c t e r i z e d i n t h a t the frame, which preferably has a thickness that is somewhat larger than the thickness of the load platform and the flexural springs, rests on, and is attached to, a substrate extending in under the load platform to work as an end stop for a swing downward of the load platform, said substrate possibly being equipped with a central opening underneath the load platform, for inspection and cleaning.

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- 11. The spring scale of claim 10, characterized in that said substrate is made of glass, and is attached to the frame by means of anodic bonding.
- 12. The spring scale of claim 1, characterized by a roof above the

c h a r a c t e r i z e d b y a roof above the load platform, said roof being attached peripherally on the frame, with a central opening above the load platform for placing objects to be weighed, and with an additional function as an end stop for possible swings upward of the load platform.

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- 13. The spring scale of claim 12, characterized in that the roof is made of glass, and that it is attached to the frame by anodic bonding.
- 14. The spring scale of claim 1,
 characterized in that the number of flexural springs is four.
 - 15. The spring scale of claim 1,

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characterized in that the mechanical structure constituted by load platform, flexural springs and frame, exhibits a four-fold rotation symmetry about a point at the center of the load platform.

5 16. The spring scale of claim 1, characterized in that the load platform and the inner edge of the frame have a substantially complementary shape.

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CLAIMS

1. A spring micro-scale, comprising a load platform suspended, by at least three flexural springs, in a surrounding frame, and with bridge-connected strain gauges arranged for measuring strain on one side of said flexural springs, said flexural springs extending in succession along substantially the whole periphery of the load platform in a gap between the load platform and an inner edge of the frame, an attachment spot on the load platform for each respective flexural spring being arranged substantially directly opposite or past an attachment spot on the inner edge of the frame for a next flexural spring in the succession, and said load platform being thin relative to said surrounding frame.

- 2. The micro-scale of claim 1,
- wherein the strain gauges are all oriented in the same direction, to obtain insensitivity regarding positioning of an object on the load platform.
- The micro-scale of claim 1,
 wherein the flexural springs are thinned down to provide high compliance for
 weighing of small objects.
 - 4. The micro-scale of claim 1, sherein the load platform, the flexural springs and the frame are shaped as one single micro-machined or etched piece of solid matter.
 - 5. The micro-scale of claim 4, wherein said piece of solid matter is a silicon piece.

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AMENDEDISHEET 1833 P.M.

1.

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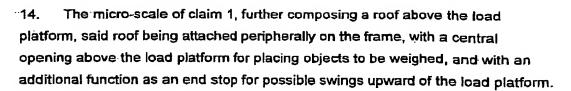
- The micro-scale of claim 4,
 wherein said strain gauges are integral in the piece of solid matter.
- 7. The micro-scale of claim 1, wherein the strain gauges are piezo-resistive resistors.
- 8. The micro-scale of claim 1, wherein each flexural spring has a strain gauge placed on a crossing between the flexural spring and the frame or the load platform.
- The micro-scale of claim 1,
 wherein the load platform is substantially quadratic.
- wherein the flexural springs lie parallel to respective side edges of the load platform.
 - 11. The micro-scale of claim 9 or 10, wherein the flexural springs have lengths substantially equal to the lengths of the closest side edges of the load platform.
- 12. The micro-scale of claim 1, wherein the frame rests on, and is attached to, a substrate extending in under the load platform to work as an end stop for a swing downward of the load platform, said substrate possibly being equipped with a central opening underneath the load platform, for inspection and cleaning.
 - 13. The micro-scale of claim 12, wherein said substrate is made of glass, and is attached to the frame by means of anodic bonding.

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15. The micro-scale of claim 14, wherein the roof is made of glass, and that it is attached to the frame by anodic bonding.

- 10 16. The micro-scale of claim 1, wherein the number of flexural springs is four.
- - 18. The micro-scale of claim 1, wherein the load platform and the inner edge of the frame have a substantially complementary shape.

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AMENDED SHEET ...

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